Evaluation of Position Description

Labor Category/FLSA: Nonexempt

_____**Current Position Description**
__X__**Proposed Position Description**

Date Prepared: 06/25/03

Approving Official: **Name:** Carolyn C. London **Signature:** Carolyn C. London
Title: HR Specialist

Position Title/Series/Grade: Electrical Engineer, GS-0850-13

ORGANIZATION: Division of Property Management, NIEHS

SEE THE EVALUATION STATEMENT THAT WAS ATTACHED TO THE PD.

Installation: National Institute of Environmental Health Sciences, National Institutes of Health, Research Triangle Park, NC

Title: Electrical Engineer

Occ Series: 850

Pay Plan: GS

Grade: 13

Introductory Statement: The Division of Property Management (DPM) serves all of the NIH Community by providing support for renovations, new construction and maintenance of existing facilities, utilities and grounds. The Division provides professional leadership for the engineering programs of the National Institutes of Health (NIH). The scope of DPM operations is such that the effectiveness with which they are carried out has a major and direct effect on the worldwide biomedical research programs of the NIH. In addition to the main facilities at the Bethesda Campus and in Poolesville, MD, NIH has facilities at Research Triangle Park, North Carolina, Rocky Mountain Laboratory in Montana and the Gerontology Research Center in Baltimore, MD. This position is organizationally and physically located within the DPM organizational subcomponent responsible for the provision of real property management services for the NIEHS facilities in Research Triangle Park, NC.

ELECTRICAL ENGINEER

GS-850-13

I. INTRODUCTION

The Facilities Engineering Branch (FEB) plans, directs, supervises, and coordinates all facilities engineering activities which include, but are not limited to: budget formulation; engineering design; facilities inspection, construction and master planning; operation of utility plants and related systems; maintenance and repair of all real property (buildings, grounds, surfaced areas, utility plants and systems); fire prevention and protection; custodial and security services; refuse collection and disposal; design, fabrication, alteration and repair of scientific instrumentation; and storage and supply of construction and maintenance materials.

This position is located in the Engineering Design Section (EDS) of the FEB. The EDS provides multi-disciplinary professional architectural and engineering services including planning, design, and construction administration in support of the National Institute of Environmental Health Sciences' (NIEHS) research programs. Services include designing and constructing new facilities; improvements, alterations and major repairs to existing facilities; and engineering studies using in-house resources and out-sourcing (A/E firms and private construction contractors).

II. MAJOR DUTIES AND RESPONSIBILITIES

Serves as electrical engineering specialist in a multi-discipline section responsible for planning, directing, reviewing, and coordinating a wide range of electrical engineering activities at the NIEHS. The employee's expertise covers modifications and/or development of systems such as power generation and distribution, lighting, signaling, fire alarm, security, elevator, communication, and control (electromechanical and digital) and monitoring. These systems are provided for a large campus-type biomedical research facility containing laboratories, animal facilities, and support buildings such as offices shops, warehouses, and central utilities plant.

Design (35%):

Prepares feasibility studies and analyses of program needs for projects that are extensive in scope, complexity and importance to reconcile project requirements with sound engineering considerations and with such other realities as building codes, standards, rules and regulations such as are found in biomedical research facilities and hospitals.

Evaluates design objectives, performs complex technical calculations, identifies most economical and efficient procedures for project design and performance, considering all influences.

Prepares preliminary drawings and cost estimates which present the solution to the completed design criteria. On larger projects, Programs of Requirements are prepared and basic design and engineering features are established. The completed design criteria serves as the basis for contract A/E detailed design development and specifications.

Serves as Project Engineer on one or more concurrent facilities design and/or evaluation projects assigned by the supervisor who delineates project goals, time and budget limitations. Employee must develop and achieve the stated objectives within assigned time and budget limits.

For assigned projects, reviews the work of contract A/Es for adequacy and thoroughness of design solutions, details, and feasibility studies. Consults with A/E as necessary to provide instruction on resolution of design problems. Determines compliance with Statement of Work, Program of Requirements, design guidelines, good architectural and engineering practices, regulations, and other considerations such as life cycle cost analysis and energy conservation. Continually reviews the work of contract A/E firms to insure design excellence and that safety and electrical space requirements are met. Reviews for quantities, adherence to cost and completion schedules, technical adequacy, conformity with contract requirements, and agreements between architectural and engineering elements, and specifications.

Conducts conferences with clients to explain the technical development of designs and obtain any review comments; coordinates the detailed technical review of the projects at required intervals with the other technical disciplines of the EDS and with other reviewing groups having responsibilities for operation and maintenance, safety, environmental health, housekeeping, etc. Assembles and coordinates all review comments, including his own, into a single comprehensive document to provide the designers with information needed to further develop the project. In preparing comprehensive review documents, obtains or recommends compromises in the design which may be brought about by budget limitations or technical conflicts.

Contract Administration (40%):

Assures that contractual requirements and program criteria are being met, and resolves problems or conflicts.

The incumbent participates in the selection of architect/engineer firms, develops criteria for selection of firms, and may serve as chairman of the official selection committee. For assigned projects, incumbent develops and is responsible for the special provisions of the A/E contract which states the working relationship between NIEHS and the A/E for the duration of the project. During the negotiations, the incumbent is responsible for refinement of the project scope and budget, taking into account the resources available with the contract specialist. Negotiates with the A/E the need for special consultants and services depending on the nature of the design process.

During construction incumbent is responsible for the technical and administrative execution of contract requirements. In his/her capacity consults with construction contractor personnel

to resolve difficult and complex unforeseen problems and latent conditions surfacing during construction and based on the conditions, has sketches or change drawings or specifications prepared solving the problems and incorporates these change documents into the contract performance documents.

Reviews and evaluates shop drawings, samples and material certifications submitted by the contractor for contract and performance requirements, recommending approval, rejection, or needed corrections or transmits these materials to the A/E for review and approval where appropriate.

As a Project Officer for construction, ensures that a log is maintained that denotes work location, progress, number of construction personnel, site conditions, conflicts, and any other special situations that arise. Provides technical support to the Contracting Officer, Acquisition Management Branch (AMB) in the negotiation of contract modifications. Processes progress payment invoices. At the end of construction, obtains release of lien, approves final invoice and forwards completed package to the AMB. In response to contractor claims, performs technical evaluation of claims for use in Contracting Officer's Decision, provides technical support to the Office of General Counsel (OGC) in litigation of appeals, including serving as a witness.

Technical Guidance (25%):

Provides planning, technical guidance, advice and counsel in oral and written forms.

Consults with research personnel and other advisory groups such as the Health & Safety Branch in efforts to improve facilities and service at NIEHS.

Serves as electrical engineering expert on discussions regarding controversial issues in connection with major assigned projects.

Prepares correspondence, technical reports, estimates, fact sheets, status reports and schedules as required to complete project assignments.

Furnishes expert technical advice to other ~~NIEHS/FEB~~ NIEHS MED staff engineers, as well as engineers with other agencies (e.g., EPA and GSA), as required.

Performs other duties as assigned.

FACTOR 1 - KNOWLEDGE REQUIRED BY THE POSITION

Mastery of advanced concepts, principles, and practices of electrical engineering that enable incumbent to serve as an expert in the full range of electrical systems for the NIEHS. Serves as a technical authority in electrical utilities and their distribution.

The employee possesses the ability to conduct master utility studies designed to provide data for long-term planning of future electrical requirements for NIEHS and to recommend to

management a schedule of the necessary additions and modifications to the existing electrical systems so as to ensure sufficient capacities in these utilities for long-range building programs. These recommendations can involve the expenditure of many millions of dollars and can require planning five years and longer in advance of the expenditure of funds. Ability to analyze short circuit calculations used in the selection of proper protective devices for the power distribution systems under design. The employee has expertise in evaluating completed drawings of primary utility components of electrical distribution systems, building power, lighting, and special power and control systems to accommodate specialized research equipment such as environmental chambers, magnetic resonance imaging units and mass spectrometers. The incumbent can utilize this information in preparation of detailed plans and specifications for construction projects.

The employee must have general knowledge of related engineering disciplines such as mechanical, structural, and architectural.

FACTOR 2 - SUPERVISORY CONTROLS

NIEHS MED MANAGER.

Assignments of work are issued by ~~Chief, FEB~~. Supervision is essentially administrative in nature with assignments made in the form of a designated project for which the scope must be developed, designed, and construction contract administered by the incumbent. The incumbent plans for and carries out projects with authority to act on own initiative on matters affecting the project's design. Master plans, deviation from agency policies, schedule changes, budget changes, and changes or actions that degrade the objective performance or alter operational characteristics of the project are submitted for final sign-off by the supervisor together with recommended courses of action, including available alternatives. The incumbent keeps the supervisor informed of progress, potentially controversial matters which he identifies by an ongoing project analysis, or issues with far-reaching implications. Otherwise, actions, decisions, and commitments are considered technically authoritative and are accepted without change. The supervisor, however, is available for consultation on policy matters. Incumbent must exercise judgment to determine priority of competing requirements when the priority is not defined by supervisor.

FACTOR 3 - GUIDELINES

Guidelines include National Electrical Code, Illuminating Engineering Society (IES), technical literature and manufacturers' data. These guides have limited applicability to many of the problems encountered. As a technical specialist, the employee must exercise judgment and creativity in deviating from traditional methods available; and must employ a versatile background in engineering theory and precedent in adapting and developing new methods as required. Serves as the resident expert and interpreter of a variety of local and national building codes and directives on electrical engineering criteria for various types of buildings.

FACTOR 4 - COMPLEXITY

Assignments involve a broad range of activities and highly specialized electrical engineering functions. As a technical expert for NIEHS, the employee continually makes far-reaching

engineering decisions regarding electrical systems and equipment. The employee is frequently confronted with novel and obscure problems which require innovative modification of existing methods and creative development of new approaches. Reviews of major building designs performed by private architect/engineer firms must be performed within short time frames, so the employee must use experience and judgment to analyze complex systems quickly and concentrate review efforts on areas of greatest impact where significant costs or energy are involved or where poor design would cause serious disruption to planned research programs.

FACTOR 5 - SCOPE AND EFFECT

The purpose of the work is to provide direction and expert technical advice to all major design projects planned for NIEHS. Projects for which the employee makes decisions are most often valued in the multimillion-dollar range. Reliability in performance of support systems in biomedical research facilities is of utmost importance; the employee must provide leadership in achieving this reliability. Work performed by the employee has significant impact on the important research efforts carried on by NIEHS and often sets the trend for future construction criteria.

FACTOR 6 - PERSONAL CONTACTS

Contacts are with private architect/engineers, State and Local Government officials, engineers with other Government agencies and private firms, NIEHS administrative and research personnel, engineers and industrial hygienists, with other peer groups at NIEHS and NIH, other FEB engineers, and contractor and manufacturer's representatives.

FACTOR 7 - PURPOSE OF CONTACTS

Contacts private architect/engineers to exchange information, coordinate work efforts, furnish technical advice, resolve controversial issues, review drawings, specifications and cost estimates and require corrections as necessary. Contacts engineers in other agencies and firms to coordinate and develop consistent policies and design approaches. Contacts NIEHS administrative and research personnel to determine scopes of work. Contacts peer group personnel to solicit advice on safety issues. Contacts other FEB engineers (e.g., mechanical, architectural) to determine equipment maintenance needs and to resolve construction problems. Confers with contractors to resolve field problems which conflict with design. Contacts manufacturer's representatives to obtain information on latest products.

FACTOR 8 - PHYSICAL DEMANDS

The work is mainly sedentary, but site surveys and investigations of construction problems require climbing on ladders, and considerable bending, stooping, squeezing through tight places, etc. Occasionally a change to work clothes is required.

FACTOR 9 - WORK ENVIRONMENT

Work is performed primarily in an office setting, with some site visits to the laboratory and animals areas where biohazard exposure can occur; some visits to mechanical equipment rooms and power plants where exposure to noise, high voltage and moving parts is common, when making field inspections.

Evaluation Statement

Identification: Electrical Engineer, GS-850-13

Nature of Action: Recruit

Referenced Standard: PCS for Electrical Engineering Series, GS-850/Electronics Engineering Series, GS-855, dated February 1971

Analysis of Duties and Responsibilities:

The referenced standard describes work which primarily requires application of knowledge of (a) the physical and engineering sciences and mathematics, (b) electrical phenomena, and (c) the principles, techniques and practices of electrical engineering. The work pertains primarily to electrical circuits, circuit elements, equipment systems, and associated phenomena concerned with electrical energy for purposes such as motive power, heating, illumination, chemical processes, or the production of localized electric or magnetic fields. The work of this position involves formulating, coordinating, evaluating and interpreting electrical plans and specifications for NIEHS facilities planning design and construction activities. This work requires the application of professional engineering knowledge of electrical equipment and electrical power systems and related engineering disciplines such as mechanical, structural, and architectural. Since this work requires the application of professional knowledge and skills of complex electrical equipment and systems, the work meets the definition of referenced standard. Electrical Engineer is the authorized title for nonsupervisory positions classified in the GS-850 series.

Evaluation:

Referenced standard describes the evaluation factors in terms of two-grade level criterions. The two-grade level criterions are: Nature of Assignment and Level of Responsibility. Subject position is evaluated by reference to the grade-level criteria as follows:

Nature of Assignment

GS-12 level engineers apply deep and diversified knowledge to atypical or highly difficult assignments, in a subject-matter or functional area, e.g., unusual problems that arise during the rework of major systems for which they have technical responsibility. Precedents for their assignments are sometimes absent, but more commonly, their relationship to the particular assignment is obscure. Conflicting issues often characterize assignments at this level. At the GS-12 level engineers apply broad knowledge of the subject matter or functional area to those assignments which can be carried out through significant and skillful

adaptation of precedents and established approaches. Referenced standard indicates that GS-12 level engineers are required to comprehend fully the relationships between their assigned and related areas and branches of engineering. Referenced standard also indicates that GS-12 level engineers may also perform preliminary engineering analyses on large and complicated projects, and, therefore, must be knowledgeable of research and development activities and technological advances in order to incorporate them into their assignments. GS-12 engineers are relied upon heavily for studies in which they thoroughly evaluate the various alternatives for meeting an objective with adequate consideration of peripheral as well as technical factors, recommending the best one. When planning large systems or complexes, employees at this level conceive several configurations, i.e., they develop and compare alternative layouts or designs which utilize equipment of various kinds and capabilities in diverse physical arrangements. Frequently, the assignments are further complicated by the many operations which the equipment or systems must perform and the many variables which the engineer must consider.

GS-13 level engineers are highly knowledgeable specialists in their subject-matter areas, which may be rather narrow, e.g., telemetry, or quite broad, or they may be authorities in functional areas, e.g., standardization or maintenance. Other engineers and managers within their activities often consult GS-13 engineers and managers within their areas of expertise. Characteristically, the assignments of the GS-13 engineers require that they represent the activity in reaching engineering compromises and agreements with engineers of other organizations and contractors; they also resolve unusual and controversial problems of a decisive nature. GS-13 level engineers plan and coordinate programs or projects for which they must be innovative and original. They devise methods and procedures which are normally adopted for use and become the activity's established precedent; sometimes they are adopted for use by other activities. GS-13 engineers review, evaluate, and advise on the effectiveness, technical adequacy and suitability of work and proposals of others (in-house, other activities, industry) in resolving complicated and critical problems in the specialized area. GS-13 engineers make critical analyses and evaluations of the ramifications, advisability, and impact of large engineering projects. At this level engineers are required to keep abreast of and evaluate new developments that pertain to their subject-matter or functional areas to insure that their program planning, approaches, findings, and decisions reflect the latest thinking in the area. GS-13 engineers apply extensive background knowledge of the broad field of engineering as well as expert knowledge in the subject-matter or functional area to the resolution of problems, development of approaches, and settlement of conflicts in their assignments.

The work assignment contained in subject position exceeds the assignments described for the GS-12 level and more appropriately matches the description for the GS-13 level. As the electrical engineer for the Institute, the incumbent is responsible for planning, directing, reviewing, and coordinating a wide range of

electrical engineering activities. This work assignment includes responsibility for modifications and/or development of power generation and distribution, lighting, signaling, fire alarm, security, elevator, communication, and control (electro mechanical and digital) and monitoring systems. Like the GS-13 standard benchmark, work requires reaching compromises and agreements with engineers of other organizations and contractors. Incumbent serves as the electrical engineering expert on discussions regarding controversial issues in connection with assigned projects and difficult and complex unforeseen problems and latent conditions surfacing during construction and based on conditions. Also like the GS-13 benchmark, incumbent must be innovative and original, both in the modification of existing methods and the development of new approaches to solve novel and obscure problems. In addition, like the benchmark, incumbent analyzes and evaluates large engineering projects, providing direction and expert technical advice to all major design projects planned for NIEHS. Projects for which the employee makes decisions are often valued in the multi-million dollar range. Incumbent must review, evaluate, and advise on the effectiveness, technical adequacy, and suitability of work and proposals of others.

Level of Responsibility

GS-12 engineers receive little technical advice or guidance. Supervisors inform them of objectives or operational requirements and relative priority of assignments, but the engineers are free to analyze problems and develop their own approaches and work plans. Technical manuals and specifications pertinent to their assignments are frequently inadequate. Work is reviewed for technical soundness and compliance with broad policy. GS-12 engineers consult with supervisors when they discover that assignments have significant unforeseen impact or that they must depart from policy.

Technical decisions and recommendations of GS-12 engineers are usually accepted by higher authority as a basis for action except when policy, program, or budgetary considerations are overriding. GS-12 engineers coordinate their assignments with those of engineers in other disciplines and represent their offices in the exchange of data and discussions of technical problems at meetings. In addition, GS-12 engineers point out areas for investigation or improvement that result in large savings and improved efficiency.

GS-13 engineers have technical responsibility for their assignments and programs, including results, and determine approaches to be used. They discuss decisions involving critical changes or major controversial issues in policy and precedent determinations. Completed work is reviewed for compliance with overall policy and attainment of program objectives.

GS-13 engineers make continuing contacts as engineering advisors and as the representatives of their organizations in interpreting and applying policies and requirements. They negotiate with engineers who have differing or opposing

views, in order to resolve the engineering aspects of controversial cases. GS-13 engineers also resolve technical problems independently, even in those areas where guidelines are lacking. They are regarded as knowledgeable advisors within their areas and defend their findings and recommendations against challenges by engineering personnel from manufacturers and other organizations.

Position under evaluation exceeds the GS-12 Level of Responsibility description and compares favorably with the GS-13 description for the following reasons: the incumbent's actions, decisions, and commitments are considered technically authoritative and are accepted without change. S/he is technically responsible for assigned projects and carries out projects with authority to act on own initiative on matters affecting project design. Employee must develop and achieve project objectives within assigned time and budget limits. Incumbent informs supervisor of potentially controversial matters that s/he identifies by ongoing project analysis, or issues with far-reaching implications.

Incumbent has continuing contacts with contractors' and manufacturers' representatives, as well as Government officials and other engineers to coordinate work, provide technical advice, resolve controversial issues, and to review drawings, specifications, and cost estimates and require corrections as necessary. Incumbent confers with contractors to resolve field problems that conflict with design.

Like the GS-13 level description in the PCS, the incumbent serves as an expert in discussions regarding controversial issues in connection with assigned projects and furnishes expert advice as required.

CONCLUSION: This position is properly classified Electrical Engineer, GS-850-13

Ann Claybone 5/4/98

Personnel Management Specialist/Date